

## KIT, MIN O<sub>2</sub> FLOW ELIMINATION

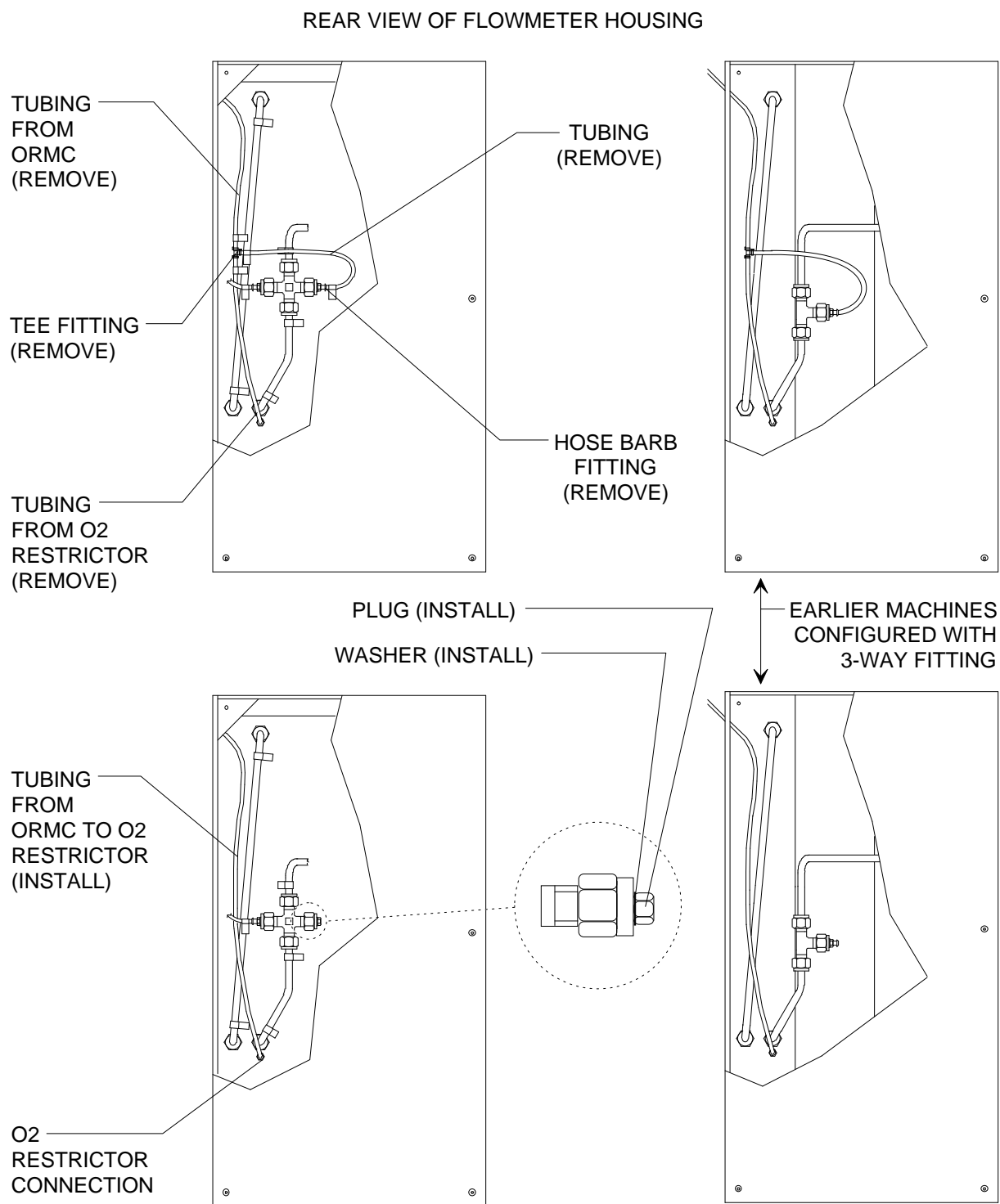
### CONVERSION PROCEDURE: 2 GAS MACHINES

**WARNING:** DO NOT install the Minimum O<sub>2</sub> Flow Elimination on machines having a low flow oxygen ratio controller (ORC) P/N 4113229.

**NOTE:** The following procedure applies to 2 gas machines. Skip to Page 5 for 3 and 4 gas machines.

1. Turn the System Power switch to STANDBY and remove AC power from the machine.
  2. Close all cylinder valves and disconnect all pipeline supplies.
  3. Remove the back cover of the flowmeter housing.
  4. Remove the back cover of the vapor box to gain access to the ORM/ORMC.
  5. Remove the press-on hose clamp and disconnect the flexible tubing from the right side (viewed from the rear) of the restrictor housing 4-way fitting. See Figure 1, upper view. (Earlier machines are configured with a 3-way fitting.)
  6. Remove the press-on hose clamp and disconnect the flexible tubing from the hose barb at the O<sub>2</sub> restrictor housing.
  7. Remove the press-on hose clamp and disconnect the flexible tubing from the O<sub>2</sub> port at the ORM or ORMC. See Figure 2.
  8. Cut any tie straps securing the flexible tubing, and remove the tubing along with the associated tee fitting.
  9. Remove the hose barb fitting from the right side of the 4-way fitting, and install a washer (P/N 4102165) and plug (P/N 4103801) as shown in the lower view of Figure 1.
  10. Connect a 35 in. length of flexible tubing (P/N ML08003) and press-on hose clamp to the hose barb at the O<sub>2</sub> restrictor housing.
  11. Connect the other end of the tubing to the hose barb at the O<sub>2</sub> port on the ORM or ORMC. Install a green O<sub>2</sub> label (PN 4109871) at each end of the tubing.
  12. Restore power to the machine and re-connect the pipeline supplies (or open the cylinder valves).
- NOTE:** For later machines without the O<sub>2</sub>/N<sub>2</sub>O ratio alarm lamp, skip to Step 15.

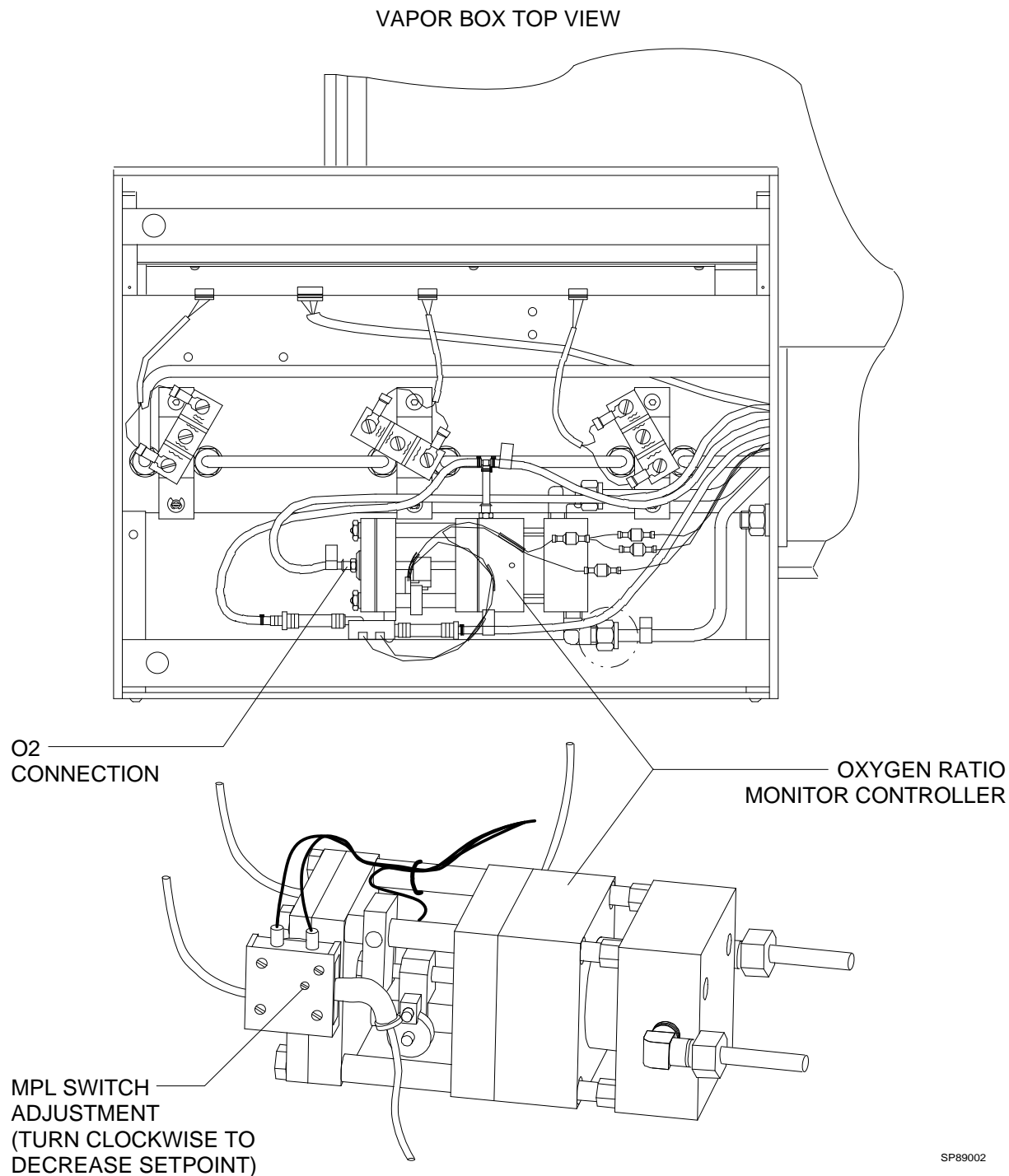
**CONVERSION PROCEDURE: 2 GAS MACHINES (continued)**



SP89001

**Figure 1: TUBING REMOVAL/INSTALLATION (MIN. O<sub>2</sub> FLOW ELIMINATION)**

**CONVERSION PROCEDURE: 2 GAS MACHINES (continued)**



SP89002

**Figure 2: ORMC O<sub>2</sub> CONNECTION AND MPL SWITCH LOCATION**

**CONVERSION PROCEDURE: 2 GAS MACHINES (continued)**

13. Open the N<sub>2</sub>O flow control valve several turns. Slowly open the O<sub>2</sub> flow control valve and observe the O<sub>2</sub>/N<sub>2</sub>O ratio alarm lamp.

The alarm lamp should be lighted when the N<sub>2</sub>O flow is above 800 ml/min.

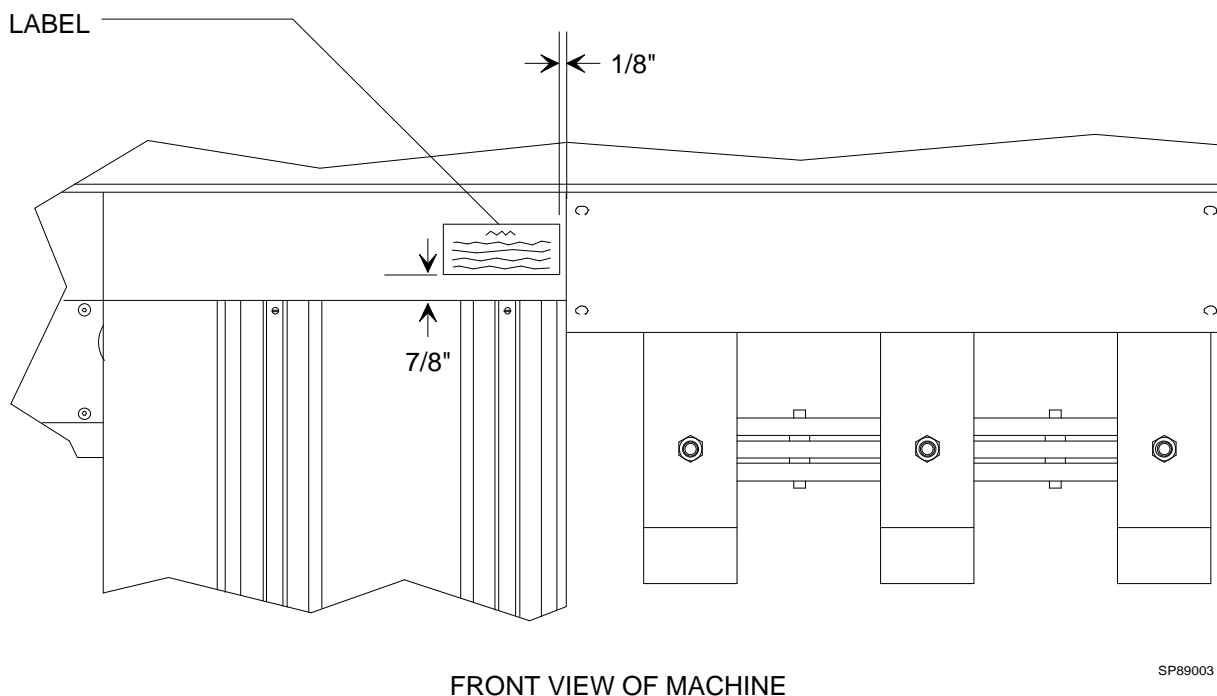
Slowly close the O<sub>2</sub> flow control valve; the alarm lamp should be off when the N<sub>2</sub>O flow is below 700 ml/min.

14. If necessary, adjust the MPL switch on the ORM or ORMC (see Figure 2) until the alarm lamp responds as noted in Step 13.

15. Reinstall the vapor box back cover, and reinstall the flowmeter housing back cover.

16. Install the Minimum Flow Elimination label on the front of the machine at the top right of the flowmeter housing - positioned as shown in Figure 3.

17. Perform a complete PMS on the machine.



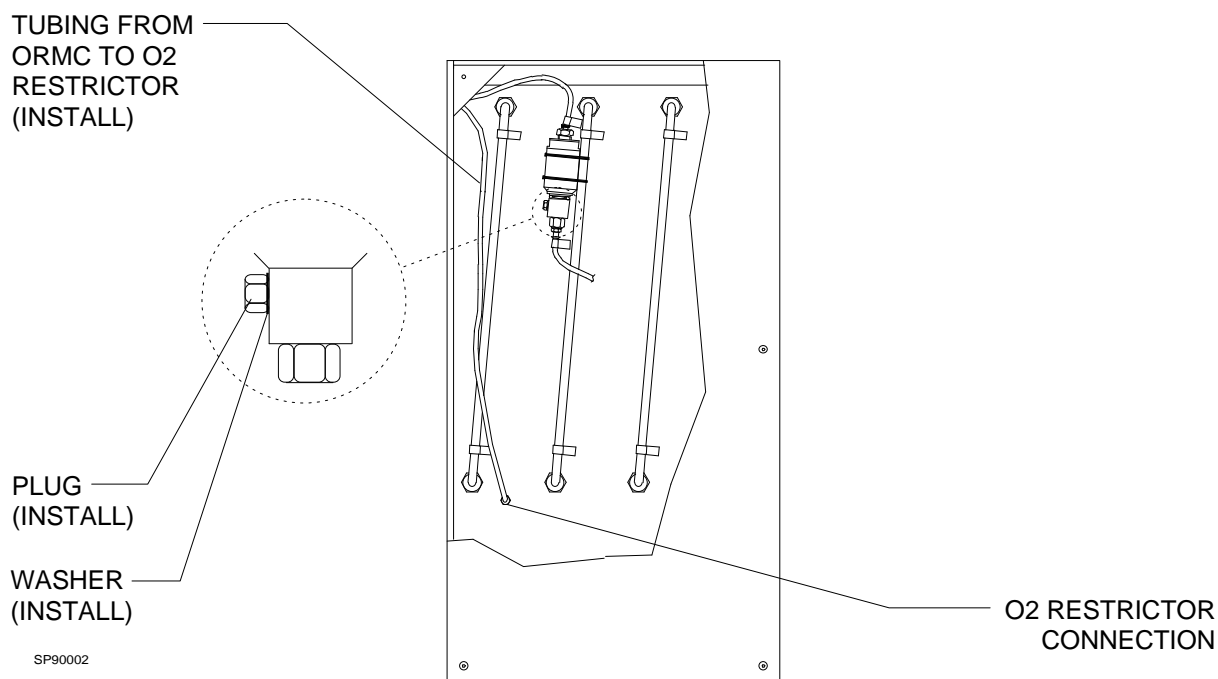
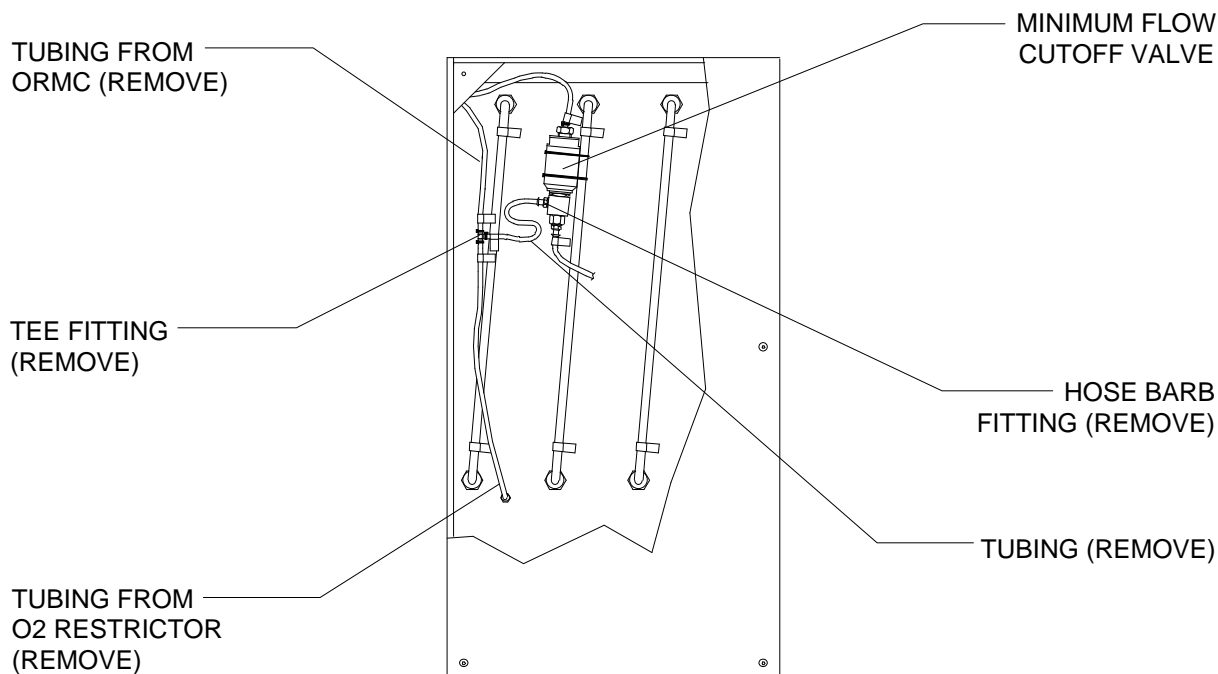
**Figure 3: MIN. O<sub>2</sub> FLOW ELIMINATION - LABEL LOCATION**

## CONVERSION PROCEDURE: 3 AND 4 GAS MACHINES

1. Turn the System Power switch to STANDBY and remove AC power from the machine.
  2. Close all cylinder valves and disconnect all pipeline supplies.
  3. Remove the back cover of the flowmeter housing.
  4. Remove the back cover of the vapor box to gain access to the ORM/ORMC.
  5. Remove the press-on hose clamp and disconnect the flexible tubing from the side hose barb on the minimum flow cut-off valve.  
  
Refer to Figure 1 for machines with Air.  
  
Refer to Figure 2 for machines without Air. (Earlier machines may be configured as shown in the alternate view.)
  6. Remove the press-on hose clamp and disconnect the flexible tubing from the hose barb at the O<sub>2</sub> restrictor housing.
  7. Remove the press-on hose clamp and disconnect the flexible tubing from the O<sub>2</sub> port at the ORM or ORMC. See Figure 3.
  8. Cut any tie straps securing the flexible tubing, and remove the tubing along with the associated tee fitting.
  9. Remove the hose barb fitting from the minimum flow cut-off valve, and install a washer (P/N 4102165) and plug (P/N 4103801) as shown in the lower view of Figure 1 and Figure 2.
  10. Connect a 35 in. length of flexible tubing (P/N ML08003) and press-on hose clamp to the hose barb at the O<sub>2</sub> restrictor housing.
  11. Connect the other end of the tubing to the hose barb at the O<sub>2</sub> port on the ORM or ORMC. Install a green O<sub>2</sub> label (PN 4109871) at each end of the tubing.
  12. Restore power to the machine and re-connect the pipeline supplies (or open the cylinder valves).
- NOTE: For later machines without the O<sub>2</sub>/N<sub>2</sub>O ratio alarm lamp, skip to Step 15.
13. Open the N<sub>2</sub>O flow control valve several turns. Slowly open the O<sub>2</sub> flow control valve and observe the O<sub>2</sub>/N<sub>2</sub>O ratio alarm lamp.

**CONVERSION PROCEDURE: 3 AND 4 GAS MACHINES (continued)**

**REAR VIEW OF FLOWMETER HOUSING**



SP90002

**Figure 1: TUBING REMOVAL/INSTALLATION, 3 & 4 GAS MACHINES WITH AIR  
(MIN. O<sub>2</sub> FLOW ELIMINATION)**

**CONVERSION PROCEDURE 3 AND 4 GAS MACHINES (continued)**

**REAR VIEW OF FLOWMETER HOUSING**

MINIMUM FLOW  
CUTOFF VALVE

TUBING FROM  
ORMC (REMOVE)

TEE FITTING  
(REMOVE)

TUBING (REMOVE)

HOSE BARB  
FITTING (REMOVE)

TUBING FROM  
O<sub>2</sub> RESTRICTOR  
(REMOVE)

TUBING FROM  
ORMC TO O<sub>2</sub>  
RESTRICTOR  
(INSTALL)

PLUG  
(INSTALL)

WASHER  
(INSTALL)

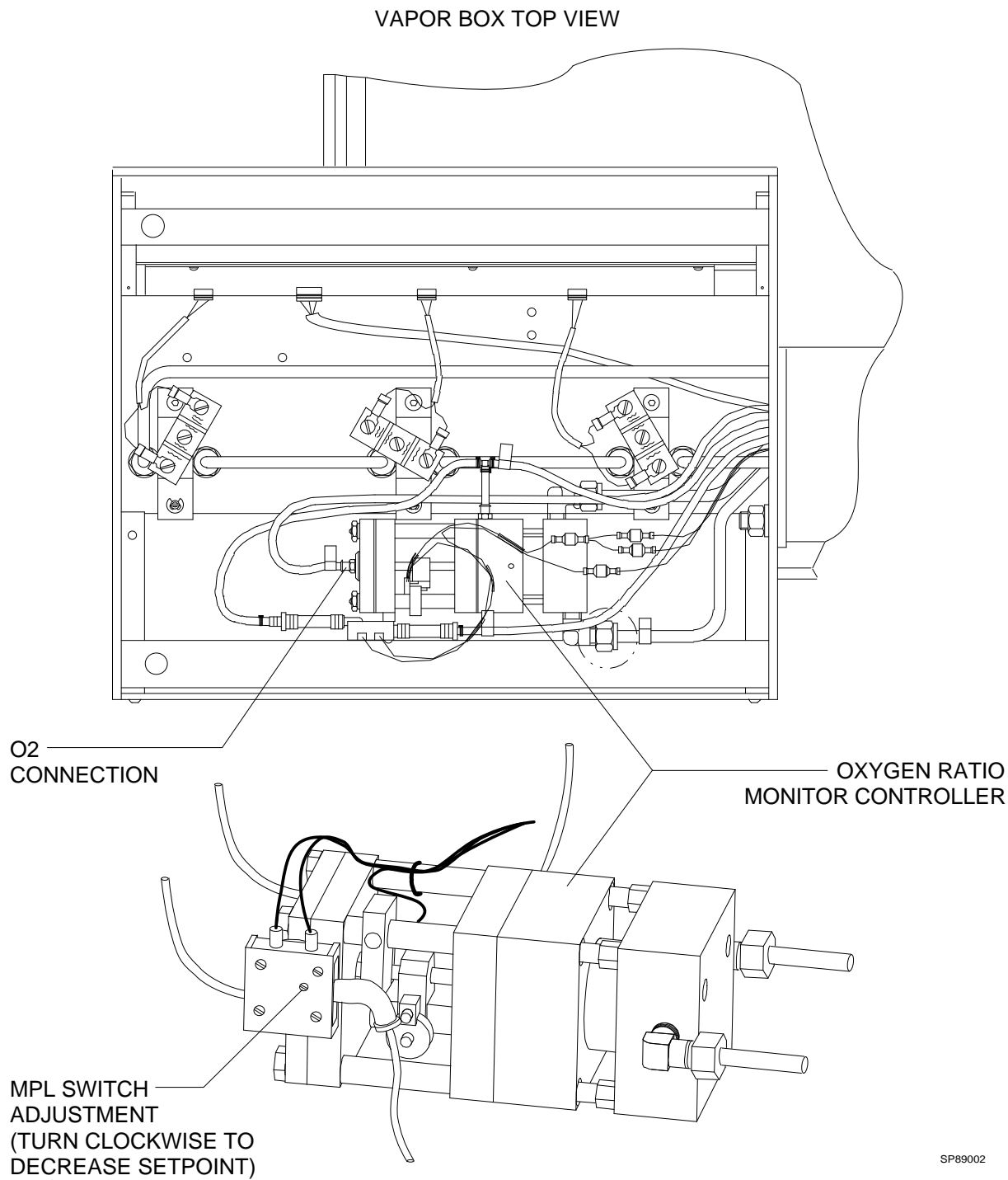
O<sub>2</sub> RESTRICTOR  
CONNECTION

EARLIER MACHINE  
CONFIGURATION

SP90001

**Figure 2: TUBING REMOVAL/INSTALLATION, 3 & 4 GAS MACHINES WITHOUT AIR  
(MIN. O<sub>2</sub> FLOW ELIMINATION)**

**CONVERSION PROCEDURE: 3 AND 4 GAS MACHINES (continued)**



**Figure 3: ORMC O<sub>2</sub> CONNECTION AND MPL SWITCH LOCATION**



**CONVERSION PROCEDURE: 3 AND 4 GAS MACHINES (continued)**

The alarm lamp should be lighted when the N<sub>2</sub>O flow is above 800 ml/min.

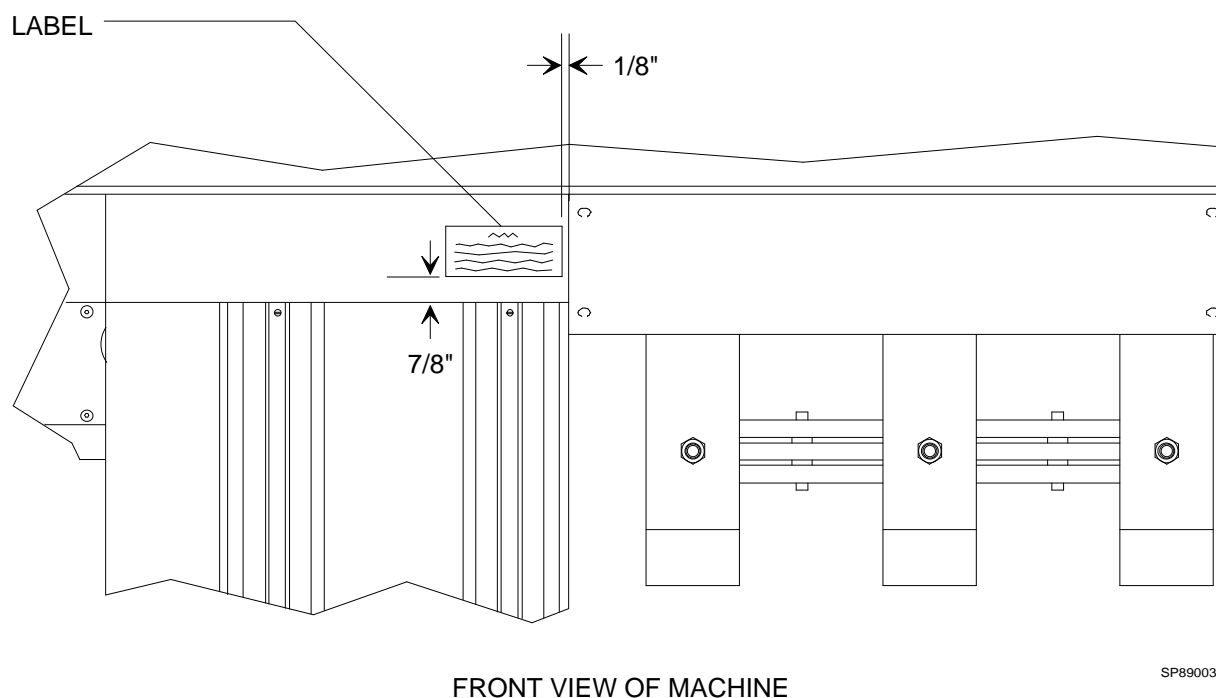
Slowly close the O<sub>2</sub> flow control valve; the alarm lamp should be off when the N<sub>2</sub>O flow is below 700 ml/min.

14. If necessary, adjust the MPL switch on the ORM or ORMC (see Figure 3) until the alarm lamp responds as noted in Step 13.

15. Reinstall the vapor box back cover, and reinstall the flowmeter housing back cover.

16. Install the Minimum O<sub>2</sub> Flow Elimination label on the front of the machine at the top right of the flowmeter housing - positioned as shown in Figure 4.

17. Perform a complete PMS on the machine.



**Figure 4: MIN. O<sub>2</sub> FLOW ELIMINATION - LABEL LOCATION**



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Technical Service Department  
3122 Commerce Drive  
Telford, PA 18969  
(215) 721-5402  
(800) 543-5047  
(215) 723-5935 Fax

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